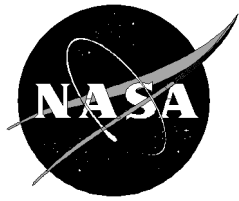


NASA/SP—2000–7501/SUPPL4



# NASA THESAURUS SUPPLEMENT

A three-part cumulative update of the  
1998 edition of the *NASA Thesaurus*

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January 2000

## The NASA STI Program Office . . . in Profile

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7121 Standard Drive  
Hanover, MD 21076-1320

NASA/SP—2000–7501/SUPPL4

# NASA THESAURUS SUPPLEMENT

A three-part cumulative update of the  
1998 edition of the *NASA Thesaurus*

**National Aeronautics and  
Space Administration**

January 2000

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# Introduction

This Supplement is a cumulative update to the 1998 edition of the *NASA Thesaurus* (NASA/SP—1998–7501). The update includes all new terms and associated hierarchies added between the cut-off for the 1998 edition (December 1997) through December 31, 1999. Parts 1 and 2 of this *Supplement* correspond to Volumes 1 and 2 of the printed edition of the *NASA Thesaurus*. Supplements are normally published every six months.

**Part 1** (*Hierarchical Listing*) contains the full hierarchical structure for each new term along with all new cross references and term definitions.

Display elements comprising the hierarchical listing are as follows:

| Display Element         | Notation |
|-------------------------|----------|
| Generic Structure ..... | GS       |
| Related Term .....      | RT       |
| Use .....               | USE      |
| Use For .....           | UF       |
| Scope Note .....        | SN       |
| Definition .....        | DEF      |
| Array Terms .....       | ∞        |

For a fuller explanation, see the Introduction (pages viii–xi) in the printed version of the 1998 *NASA Thesaurus*, Volume 1.

**Part 2** (*Rotated Term Display*) is a ready reference tool which provides additional ‘access points’ to the thesaurus terminology. It contains the postable terms and nonpostable cross references found in the Hierarchical Listing (Part 1) arranged in a KWIC (key-word-in-context) index.

**Part 3** (*Changes*) is a listing of deletions or changes to postable terms or USE references made since the 1998 edition of the *NASA Thesaurus*. To control the size of the Supplement, only significant changes in term hierarchies and related term lists are presented.

NOTE: Other resources and products related to the NASA Thesaurus can be found at the following URL:  
**<http://www.sti.nasa.gov/thesfrm1.htm>.**

In addition to the above mentioned resources, a thesaurus listserv has been set up for submitting candidate terms and discussion of related lexicographical issues. A listing of candidate and accepted new terms is posted monthly. To subscribe to this listserv, send an e-mail message to **[listserv@sti.nasa.gov](mailto:listserv@sti.nasa.gov)**. Leave the subject line blank and in the message section, type **SUBSCRIBE THESAURUS-L <Your name>**. (Should you wish to cancel your subscription, send a message to the same address with UNSUBSCRIBE in the message section.)

Comments and suggestions regarding the NASA Thesaurus should be directed to:

Lexicographer  
NASA Center for AeroSpace Information  
7121 Standard Drive  
Hanover, MD 21076–1320

E-mail: [help@sti.nasa.gov](mailto:help@sti.nasa.gov)  
Fax: (301) 621–0134  
Telephone: (301) 621–0114

# NASA THESAURUS SUPPLEMENT

## PART 1 HIERARCHICAL LISTING

### A

*ACE satellite*

USE **Advanced Composition Explorer**

#### **Advanced Composition Explorer**

(added December 1999)

DEF Explorer spacecraft (launched August 25, 1997) carrying six high-resolution sensors and three monitoring instruments for sampling low-energy particles of solar origin and high-energy galactic particles. From a vantage point approximately 1/100 of the distance from the Earth to the Sun, the Advanced Composition Explorer (ACE) can perform measurements over a wide range of energy and nuclear mass, under all solar wind flow conditions and during both large and small particle events including solar flares. When reporting space weather ACE can provide an advance warning of geomagnetic storms.

UF *ACE satellite*

GS artificial satellites  
. scientific satellites

. . Explorer satellites

. . . **Advanced Composition Explorer**

RT energetic particles  
galactic cosmic rays  
interplanetary medium  
solar corpuscular radiation  
solar cosmic rays  
solar wind  
space weather

#### **aeroshells**

(added May 1999)

DEF Aerodynamic structural shells that attach to, or comprise a portion of, the exterior of an aerospace vehicle or space probe; especially such structures that support atmospheric entry, aerobraking, aerassist, or hypersonic flight.

GS aerodynamic configurations

. **aeroshells**

RT aeromaneuvering  
nose cones  
reentry vehicles  
spacecraft design  
spacecraft shielding  
spacecraft structures

#### **Alpha Magnetic Spectrometer**

(added June 1998)

UF *AMS (spectrometer)*

GS measuring instruments  
. spectrometers

. . **Alpha Magnetic Spectrometer**

RT antimatter  
Cerenkov counters  
cosmic rays  
dark matter  
International Space Station  
interstellar matter  
magnetic spectroscopy  
space station payloads  
spaceborne astronomy

*AM-1 (EOS) spacecraft*

USE **Terra spacecraft**

*AMS (spectrometer)*

USE **Alpha Magnetic Spectrometer**

#### **anisoplanatism**

(added May 1999)

DEF In adaptive optics (AO) systems, a performance-degrading effect that arises whenever light from the wave-front sensor beacon and light from the target object sample different volumes of optical turbulence. This effect results in an increased value of the aperture-averaged residual phase variance after AO compensation, which causes an exponential decrease in system performance.

RT aberration  
adaptive optics  
atmospheric correction  
atmospheric optics  
image resolution  
optical correction procedure  
phase error  
telescopes

#### **antenna gain**

(added June 1998)

GS amplification

. **antenna gain**

RT antennas  
automatic gain control  
directional antennas  
effectiveness  
high gain  
signal reception

#### **antiphase boundaries**

(added March 1998)

UF *antiphase domains*

*APB (materials)*

GS boundaries

. **antiphase boundaries**

RT binary alloys  
crystal dislocations  
crystal lattices  
crystal structure  
grain boundaries  
interfacial energy  
intermetallics  
microstructure  
order-disorder transformations  
solid solutions  
solid-solid interfaces  
superlattices  
ternary alloys

*antiphase domains*

USE **antiphase boundaries**

*APB (materials)*

USE **antiphase boundaries**

*archaeomagnetism*

USE **paleomagnetism**

#### **associative memory**

(added December 1999)

DEF A method or device for data storage in which data is identified by a part or properties of its content, rather than by an address or relative position.

UF *associative storage*

*content-addressable memory*

GS memory (computers)

. **associative memory**

RT associative processing (computers)  
computer storage devices  
neural nets  
optical memory (data storage)

*associative storage*

USE **associative memory**

#### **bevel gears**

(added May 1999)

GS gears

. **bevel gears**

. . spiral bevel gears

RT gear teeth

#### **biomass burning**

(added December 1999)

DEF Burning of vegetation in forests, grasslands, and agricultural lands usually carried out to clear the land and change its use; a significant contributor to the global budgets of many radiatively and chemically active gases and particulates in the atmosphere.

GS combustion

. **biomass burning**

RT air pollution  
climate change  
combustion products  
contaminants  
deforestation  
environment pollution  
forest fires  
man environment interactions  
smoke

#### **Biot-Savart law**

(added August 1998)

DEF Law describing the intensity of a magnetic field produced by a current carrying wire. Also applied in fluid dynamics to describe the flow-velocity field induced by a vortex.

GS laws

. **Biot-Savart law**

RT electromagnetism  
flow velocity  
magnetic fields  
Maxwell equation  
vortices

#### **Boeing 717 aircraft**

(added October 1998)

GS Boeing aircraft

. **Boeing 717 aircraft**

commercial aircraft

. **Boeing 717 aircraft**

jet aircraft

. turbofan aircraft

. . **Boeing 717 aircraft**

monoplanes

. **Boeing 717 aircraft**

passenger aircraft

. **Boeing 717 aircraft**

transport aircraft

. **Boeing 717 aircraft**

RT<sub>∞</sub> aircraft

## bohrium

### bohrium

(added May 1998)

GS chemical elements

. **bohrium**

RT hassium  
seaborgium

### Bond number

(added December 1999)

DEF Dimensionless number representing the ratio between gravitational force and the surface tension of a bubble, drop, or meniscus.

GS dimensionless numbers

. **Bond number**

RT drops (liquids)  
gravitational effects  
interfacial tension  
menisci

### cascode devices

(added August 1998)

DEF Amplifier devices consisting of a common grounded-emitter (cathode) or source stage that drives a grounded-base output stage, resulting in high-impedance, high-gain, and low-noise,

GS amplifiers

. **cascode devices**

electronic equipment

. solid state devices

. . semiconductor devices

. . . **cascode devices**

RT CMOS

field effect transistors  
high electron mobility transistors  
switching circuits  
transistor amplifiers  
transistor circuits  
transistors

### chain reactions (chemistry)

(added May 1999)

GS chemical reactions

. **chain reactions (chemistry)**

RT chemical lasers  
combustion chemistry

### chain reactions (nuclear physics)

(added May 1999)

GS nuclear reactions

. nuclear fission

. . **chain reactions (nuclear physics)**

RT fission products  
neutrons

*Chandra X Ray Astrophysics Facility*

USE **X Ray Astrophysics Facility**

### clamped structures

(added February 1998)

RT beams (supports)

clamps

composite structures

joints (junctions)

laminates

plates (structural members)

shells (structural forms)

structural members

structural vibration

∞ structures

### cloud-to-cloud discharges

(added August 1999)

GS electric current

. electric discharges

. . lightning

. . . **cloud-to-cloud discharges**

### cloud-to-ground discharges

(added August 1999)

GS electric current

. electric discharges

. . lightning

. . . **cloud-to-ground discharges**

### Comet Nucleus Tour

(added February 1999)

DEF A NASA Discovery-class mission to acquire imagery and comparative spectral maps of comet nuclei and analyze comet dust flows. The mission spacecraft will fly to within 100 kilometers of at least three near-Earth comets including Comet Encke, Comet Schwassmann-Wachmann, and Comet d'Arrest.

UF **CONTOUR (mission)**

GS space missions

. flyby missions

. . **Comet Nucleus Tour**

RT comet nuclei

Encke comet

Schwassmann-Wachmann comet

swingby technique

*content-addressable memory*

USE **associative memory**

*CONTOUR (mission)*

USE **Comet Nucleus Tour**

### Cooper-Harper ratings

(added August 1999)

GS flight characteristics

. pilot ratings

. . **Cooper-Harper ratings**

ratings

. pilot ratings

. . **Cooper-Harper ratings**

RT aircraft performance

helicopter performance

### corrugated waveguides

(added February 1998)

GS waveguides

. **corrugated waveguides**

RT gratings (spectra)

optical waveguides

waveguide antennas

*cosmions*

USE **weakly interacting massive particles**

### critical current

(added December 1999)

DEF A current value in a superconductive material, at a particular constant temperature and in the absence of a magnetic field, below which the material is superconducting and above which the material behaves normally.

GS electric current

. **critical current**

RT critical temperature

current density

superconductivity

superconductors (materials)

### cuprates

(added April 1999)

GS copper compounds

. **cuprates**

RT BSCCO superconductors

copper oxides

YBCO superconductors

### cycloaddition

(added June 1998)

DEF Pericyclic chemical reaction in which unsaturated molecules combine to form a cyclic compound under the influence of heat or light.

GS chemical reactions

. **cycloaddition**

. . Diels-Alder reactions

RT cyclic compounds

photochemical reactions

polymerization

synthesis (chemistry)

*Darkstar unmanned aerial vehicle*

USE **pilotless aircraft**

**reconnaissance aircraft**

### Deep Space 1 Mission

(added October 1998)

DEF First of several technology demonstration missions supporting the NASA New Millennium Program. Advanced technologies include an ion propulsion system, solar concentrator arrays, autonomous navigation and control systems, an integrated camera and imaging spectrometer, and several telecommunications and microelectronics devices. The mission plan includes a flyby of Asteroid 1992 KD.

UF **DS1 (space mission)**

GS space missions

. **Deep Space 1 Mission**

RT asteroid missions

autonomous navigation

flyby missions

interplanetary spacecraft

ion propulsion

NASA space programs

solar electric propulsion

### deformable mirrors

(added May 1998)

GS mirrors

. **deformable mirrors**

RT adaptive optics

light modulation

phase modulation

segmented mirrors

### Delta 3 launch vehicle

(added October 1998)

GS launch vehicles

. Delta launch vehicle

. . **Delta 3 launch vehicle**

### Delta 4 launch vehicle

(added October 1998)

GS launch vehicles

. Delta launch vehicle

. . **Delta 4 launch vehicle**

### dielectric waveguides

(added February 1998)

GS waveguides

. **dielectric waveguides**

RT dielectrics

microwave transmission

optical waveguides

waveguide antennas

waveguide filters

### differential games

(added October 1998)

GS games

. **differential games**

RT minimax technique

optimal control

pursuit-evasion games

stochastic processes

zero sum games

**digital cameras**  
(added July 1998)  
GS optical equipment  
. cameras  
. . **digital cameras**  
photographic equipment  
. cameras  
. . **digital cameras**  
RT CCD cameras  
digital systems  
digital techniques  
photogrammetry  
television cameras  
video equipment

*DS1 (space mission)*  
USE **Deep Space 1 Mission**

**dubnium**  
(added May 1998)  
GS chemical elements  
. **dubnium**  
RT rutherfordium  
seaborgium

*EAM (physical chemistry)*  
USE **embedded atom method**

*ekranoplanes*  
USE **wing-in-ground effect vehicles**

**electronic structure**  
(added April 1999)  
SN (THE TERM "ATOMIC STRUCTURE" WAS USED FOR THIS CONCEPT PRIOR TO MAY 1999)  
RT atomic structure  
band structure of solids  
electron energy  
electron orbitals  
electron states  
energy bands  
energy gaps (solid state)  
energy levels  
Fermi liquids

**embedded atom method**  
(added February 1998)  
DEF A semiempirical calculation method developed by Daw and Baskes for determining the energetics of atoms in a bulk environment. The original form of the method was based on density functional theory and was intended primarily for tight-packed transition metals. More recent modifications have extended the applicability of the method to a large number of elements in the periodic table.  
UF *EAM (physical chemistry)*  
*MEAM (physical chemistry)*  
*modified embedded atom method*  
RT alloys  
crystal defects  
grain boundaries  
interatomic forces  
metals  
∞ methodology  
molecular dynamics  
potential energy

*enantiomeric compounds*  
USE **enantiomers**

**enantiomers**  
(added August 1998)  
DEF Isomeric pairs whose crystalline forms or molecular structures are non-superimposable mirror images.  
UF *enantiomeric compounds*

*enantiomorphs*  
GS isomers  
. **enantiomers**  
RT chirality  
crystal structure  
isomorphism  
molecular structure  
stereochemistry  
symmetry

*enantiomorphs*  
USE **enantiomers**

**environmental cleanup**  
(added February 1999)  
GS cleaning  
. **environmental cleanup**  
RT decontamination  
environment management  
environment protection  
hazardous wastes  
oil pollution  
oil slicks  
pollution control  
reclamation  
soil pollution  
waste disposal  
waste treatment  
water pollution  
water treatment

*EOS AM-1 spacecraft*  
USE **Terra spacecraft**

*Euler-Bernoulli beam theory*  
USE **Euler-Bernoulli beams**

**Euler-Bernoulli beams**  
(added April 1998)  
UF *Euler-Bernoulli beam theory*  
GS structural members  
. beams (supports)  
. . **Euler-Bernoulli beams**  
RT axial strain  
bending  
bending vibration  
dynamic structural analysis  
elastic properties  
mathematical models  
partial differential equations  
structural analysis  
Timoshenko beams

**evanescent waves**  
(added March 1998)  
GS surface waves  
. **evanescent waves**  
RT acoustic impedance  
evanescence  
fiber optics  
internal waves  
plane waves  
propagation modes  
reflected waves  
wave propagation  
∞ waves

*FDTD (mathematics)*  
USE **finite difference time domain method**

**ferroelastic materials**  
(added June 1998)  
GS **ferroelastic materials**  
. shape memory alloys  
. . nitinol alloys  
RT ceramics  
ferroelasticity  
ferroelectric materials  
∞ materials

smart materials

**ferroelasticity**  
(added June 1998)  
GS mechanical properties  
. elastic properties  
. . **ferroelasticity**  
RT crystal structure  
domain wall  
ferroelastic materials  
ferroelectricity  
phase transformations  
shape memory alloys  
smart materials

**fiber pushout**  
(added September 1999)  
GS releasing  
. **fiber pushout**  
RT ceramic matrix composites  
composite materials  
debonding (materials)  
destructive tests  
failure modes  
fiber composites  
fiber pullout  
fiber-matrix interfaces  
fibers  
interfacial energy  
∞ materials tests  
metal matrix composites  
reinforcing fibers

**field tests**  
(added November 1998)  
SN (EXCLUDES TESTS OF ELECTRIC, MAGNETIC, OR ELECTROMAGNETIC FIELDS)  
DEF Tests carried out in the actual setting in which the subject device is intended to operate.  
RT environmental tests  
performance tests  
∞ tests

**finite difference time domain method**  
(added April 1999)  
UF *FDTD (mathematics)*  
GS analysis (mathematics)  
. numerical analysis  
. . approximation  
. . . finite difference theory  
. . . . **finite difference time domain method**  
. time domain analysis  
. . **finite difference time domain method**  
RT computational electromagnetics  
electromagnetic scattering

**free-space optical communication**  
(added June 1998)  
GS telecommunication  
. communication  
. . optical communication  
. . . **free-space optical communication**  
RT high power lasers  
laser beams  
satellite communication  
space communication

**free-space optical interconnects**  
(added June 1998)  
UF *FSOI (integrated optics)*  
GS optical interconnects  
. **free-space optical interconnects**  
RT integrated optics  
interprocessor communication  
optical computers



## frequency domain analysis

optical switching  
optoelectronic devices  
photonics

### frequency domain analysis

(added April 1999)

GS analysis (mathematics)  
. **frequency domain analysis**  
RT control systems design  
dynamic response  
frequency response  
parameter identification  
signal processing

*FSOI (integrated optics)*

USE **free-space optical interconnects**

### fullerides

(added February 1998)

GS carbon compounds  
. **fullerides**  
RT  $\infty$  alkali metal compounds  
 $\infty$  chemical compounds  
doped crystals  
fullerenes  
superconductors (materials)

*fuselage-wing stores*

USE **wing-fuselage stores**

### fusion propulsion

(added September 1999)

GS propulsion  
. nuclear propulsion  
. . **fusion propulsion**  
RT inertial confinement fusion  
nuclear electric propulsion  
nuclear fusion  
nuclear rocket engines  
plasma propulsion  
spacecraft propulsion

### Gabor filters

(added February 1998)

GS image filters  
. **Gabor filters**  
RT computer vision  
 $\infty$  filters  
Gabor transformation  
image analysis  
image processing  
low pass filters  
neural nets  
spatial filtering  
textures

### Gabor transformation

(added February 1998)

GS transformations (mathematics)  
. **Gabor transformation**  
RT Fourier transformation  
Gabor filters  
holography  
image processing  
signal analysis  
wavelet analysis

### games

(added October 1998)

GS **games**  
. differential games  
. pursuit-evasion games  
. war games  
. zero sum games  
RT control theory  
game theory  
optimization

### Genesis mission

(added February 1999)

DEF A space mission to collect solar wind samples from a halo orbit about the sun-Earth L1 point for two years, returning those samples to Earth in 2003 for analysis and examination. Analysis of the samples collected by the mission will contribute to an understanding of the origins of the solar system.

GS space missions  
. **Genesis mission**  
RT solar system evolution  
solar wind

### glucocorticoids

(added December 1999)

DEF Adrenocortical steroid hormones that are involved in the metabolism of fats, proteins, and carbohydrates, and have anti-inflammatory properties.

GS organic compounds  
. lipids  
. . steroids  
. . . corticosteroids  
. . . . **glucocorticoids**  
secretions  
. endocrine secretions  
. . hormones  
. . . corticosteroids  
. . . . **glucocorticoids**  
RT adrenal gland  
atrophy  
carbohydrate metabolism  
hormone metabolisms  
hypokinesia  
lipid metabolism  
muscles  
protein metabolism

### Godunov method

(added February 1998)

DEF Non-oscillatory finite-volume scheme that incorporates the exact or approximate solution to the Riemann initial-value problem, or a generalization of it.

GS analysis (mathematics)  
. numerical analysis  
. . finite volume method  
. . . **Godunov method**  
procedures  
. finite volume method  
. . **Godunov method**  
RT approximation  
Cauchy problem  
Cauchy-Riemann equations  
computational fluid dynamics  
Euler equations of motion  
finite difference theory  
shock wave interaction  
supersonic flow

### H-2 control

(added February 1998)

GS automatic control  
. optimal control  
. . **H-2 control**  
optimization  
. optimal control  
. . **H-2 control**  
RT control systems design  
control theory  
controllers  
feedback control  
H-infinity control  
linear quadratic Gaussian control

### Hale-Bopp comet

(added July 1998)

DEF Long-period comet discovered July 23, 1995; designated C/1995 O1.  
GS celestial bodies  
. comets  
. . **Hale-Bopp comet**  
RT Oort cloud

### hardware-in-the-loop simulation

(added February 1999)

UF *hardware-in-the-loop tests*  
GS simulation  
. **hardware-in-the-loop simulation**  
RT computerized simulation  
control simulation  
performance tests  
systems simulation

*hardware-in-the-loop tests*

USE **hardware-in-the-loop simulation**

### hassium

(added May 1998)

GS chemical elements  
. **hassium**  
RT bohrium  
meitnerium

### head up tilt

(added March 1998)

DEF Body posture while lying on a tilt table with the head higher than the rest of the body.  
UF *HUT (physiology)*  
GS posture  
. **head up tilt**  
RT aerospace medicine  
bed rest  
bioastronautics  
cardiovascular system  
gravitational physiology  
head down tilt  
hemodynamic responses  
lower body negative pressure  
orthostatic tolerance  
physiological responses  
supine position  
weightlessness simulation

### heavy fermion superconductors

(added April 1999)

GS conductors  
. superconductors (materials)  
. . **heavy fermion superconductors**  
intermetallics  
. heavy fermion systems  
. . **heavy fermion superconductors**

### heavy fermion systems

(added April 1999)

GS intermetallics  
. **heavy fermion systems**  
. . heavy fermion superconductors  
RT fermions  
superconductors (materials)

### heavy metals

(added July 1999)

DEF Metals or alloys having a high specific gravity; usually ones with a density greater than 5 grams per cubic centimeter.

GS metals  
. **heavy metals**  
RT cadmium  
chromium  
contaminants  
copper  
industrial wastes

lead (metal)  
mercury (metal)  
soil pollution  
toxic hazards  
zinc

### hindcasting

(added July 1999)

DEF The process of reconstructing the time and space evolution of an atmospheric or oceanic phenomenon that has occurred in the past, through an analysis of historical data, a mathematical-model simulation of the processes involved, or a combination of data analysis and modeling.

GS predictions  
. **hindcasting**  
RT forecasting  
meteorological parameters  
nowcasting  
oceanographic parameters  
weather forecasting

HUT (physiology)

USE **head up tilt**

hybrid-Trefftz finite element method

USE **finite element method**  
**Trefftz method**

### hypothetical particles

(added November 1999)

GS particles  
. elementary particles  
. . . **hypothetical particles**  
. . . gluons  
. . . gravitinos  
. . . gravitons  
. . . partons  
. . . quarks  
. . . tachyons  
. . . weakly interacting massive particles

### hypothetical planets

(added June 1998)

UF *Phaethon (hypothetical planet)*  
*planet X*  
*transplutonic planets*  
GS celestial bodies  
. planets  
. . . **hypothetical planets**  
RT comets  
extrasolar planets  
planetary orbits

### in vitro methods and tests

(added May 1999)

DEF Tests of, or methods related to, biological or biochemical processes occurring in an artificial environment or outside of a living cell or organism.

RT bioassay  
biotechnology  
conditions  
culture techniques  
cytology  
fertilization  
histology  
in vivo methods and tests  
∞ methodology  
∞ tests

### in vivo methods and tests

(added May 1999)

DEF Tests of, or methods related to, biological or biochemical processes occurring within a living cell or organism.

RT bioassay

biotechnology  
conditions  
culture techniques  
cytology  
histology  
in vitro methods and tests  
intravenous procedures  
∞ methodology  
∞ tests

*inflight simulation*

USE **in-flight simulation**

### in-flight simulation

(added October 1998)

DEF The use of a specialized test aircraft to simulate the flight characteristics of another vehicle. The test aircraft is typically capable of duplicating the computed responses of the simulated vehicle through special aerodynamic and control system features.

UF *inflight simulation*  
GS simulation  
. flight simulation  
. . . **in-flight simulation**  
RT aircraft control  
flight characteristics  
flight control  
flight simulators  
flight tests  
training simulators

*intelligent materials*

USE **smart materials**

### intercalibration

(added January 1999)

DEF Calibration between two or more data sources, including (1) the comparison of data sets acquired by different types of measurement systems for the purpose of deducing the calibration values for one of the measurement systems; (2) the mutual calibration of data from different measurement systems through the comparison of the data with model calculations; and (3) the calibration of multiple detectors on a single instrument through the comparison of data from each detector.

GS calibrating  
. **intercalibration**  
RT comparison  
correction  
multisensor applications  
standardization

### intracloud discharges

(added August 1999)

GS electric current  
. electric discharges  
. . . lightning  
. . . **intracloud discharges**

### ion optics

(added June 1998)

RT beam waveguides  
beamforming  
electron optics  
ion beams  
ion engines  
ion propulsion  
mass spectrometers  
∞ optics

### Iridium network

(added December 1998)

DEF A 66-satellite wireless personal telecommunications network designed to provide world-

wide telephone, paging, facsimile and data services to handheld or mobile equipment.

UF *Iridium satellites*  
GS networks  
. communication networks  
. . . **Iridium network**  
. . . satellite networks  
. . . satellite constellations  
. . . **Iridium network**  
RT communication satellites  
facsimile communication  
mobile communication systems  
satellite communication  
telephony  
wireless communication

*Iridium satellites*

USE **communication satellites**  
**Iridium network**

### Java (programming language)

(added December 1998)

GS languages  
. programming languages  
. . . high level languages  
. . . **Java (programming language)**  
RT C++ (programming language)  
client server systems  
internets  
object-oriented programming  
World Wide Web

### Josephson effect

(added April 1999)

UF *Josephson tunneling*  
RT electron tunneling  
Josephson junctions  
SIS (superconductors)  
superconducting devices  
superconductors (materials)

*Josephson tunneling*

USE **Josephson effect**

### kink bands

(added March 1998)

RT buckling  
compression loads  
edge dislocations  
failure modes  
fiber composites  
microstructure  
plastic deformation  
reinforcing fibers  
single crystals

### kinking

(added April 1998)

RT bending  
buckling  
compression loads  
cracking (fracturing)  
deformation  
displacement  
failure modes  
fiber composites  
folding  
heaving  
twisting  
wrinkling

### Laves phases

(added August 1998)

GS solid phases  
. **Laves phases**  
RT alloys  
crystal lattices  
crystal structure

## leaders (meteorology)

cubic lattices  
interstitials  
microstructure  
phase transformations

### leaders (meteorology)

(added August 1999)

GS electric current  
. electric discharges  
. lightning  
. . . **leaders (meteorology)**  
. . . stepped leaders

### lithium batteries

(added December 1999)

GS electrochemical cells  
. electric batteries  
. . **lithium batteries**  
. . . lithium sulfur batteries  
RT storage batteries

### Long March launch vehicles

(added January 1999)

GS launch vehicles  
. **Long March launch vehicles**  
RT Chinese space program  
Chinese spacecraft  
heavy lift launch vehicles

### Lunar Prospector

(added February 1998)

GS artificial satellites  
. lunar satellites  
. . **Lunar Prospector**  
lunar spacecraft  
. lunar satellites  
. . **Lunar Prospector**  
RT lunar composition  
lunar exploration  
lunar programs  
lunar resources  
lunar surface

### MACHOs (astronomy)

USE **massive compact halo objects**

### magnetic nozzles

(added September 1999)

DEF Nozzle devices used in some nuclear and plasma propulsion systems that utilize magnetic fields to direct and accelerate plasma flows, thereby providing thrust for propulsion.

RT coaxial plasma accelerators  
electric rocket engines  
∞ nozzles  
nuclear propulsion  
nuclear rocket engines  
plasma acceleration  
plasma engines  
plasma propulsion  
rocket nozzles  
spacecraft propulsion

### magnetostratigraphy

(added April 1999)

GS stratigraphy  
. **magnetostratigraphy**  
RT geochronology  
paleomagnetism

### Mars Climate Orbiter

(added March 1999)

DEF One of two spacecraft comprising the Mars Surveyor 98 program; launched December 1998. After obtaining a polar, nearly circular orbit around Mars, the Orbiter will serve as a radio relay during the Lander surface mission, then begin monitoring the atmosphere, surface, and polar

caps for a complete Martian year. The Orbiter carries two science instruments: the Pressure Modulated Infrared Radiometer and the Mars Color Imager.

UF *Mars Surveyor 98 Orbiter*  
GS interplanetary spacecraft  
. Mars probes  
. . **Mars Climate Orbiter**  
unmanned spacecraft  
. space probes  
. . Mars probes  
. . . **Mars Climate Orbiter**  
RT Mars atmosphere  
Mars missions  
Mars Polar Lander  
Mars surface  
Mars Surveyor 98 Program

### Mars Global Surveyor

(added March 1999)

DEF Spacecraft and related mission designed to orbit Mars over a two year period and collect data on the surface morphology, topography, composition, gravity, atmospheric dynamics, and magnetic field. Launched November 1996.

UF *MGS (spacecraft)*  
GS interplanetary spacecraft  
. Mars probes  
. . **Mars Global Surveyor**  
unmanned spacecraft  
. space probes  
. . Mars probes  
. . . **Mars Global Surveyor**  
RT Mars atmosphere  
Mars missions  
Mars Observer  
Mars surface

### Mars missions

(added February 1999)

GS space missions  
. **Mars missions**  
. . manned Mars missions  
. . Mars sample return missions  
. . Mars Surveyor 2001 Mission  
RT Earth–Mars trajectories  
Mars Climate Orbiter  
Mars exploration  
Mars Global Surveyor  
Mars landing  
Mars Observer  
Mars Pathfinder  
Mars Polar Lander  
Mars probes  
Mars surface samples  
Mars Surveyor 98 Program  
∞ missions  
return to Earth space flight

### Mars Polar Lander

(added March 1999)

DEF One of two spacecraft comprising the Mars Surveyor 98 program; launched January 1999. After a soft landing near the Martian south pole, the Lander will search for near–surface ice and possible surface records of cyclic climate change, and characterize physical processes key to the seasonal cycles of water, carbon dioxide and dust on Mars. Prior to landing, the Deep Space 2 microprobes will be released as part of a technology–validation mission related to multiple–lander spacecraft.

UF *Mars Surveyor 98 Lander*  
GS interplanetary spacecraft  
. Mars probes  
. . **Mars Polar Lander**  
unmanned spacecraft

. space probes  
. . Mars probes  
. . . **Mars Polar Lander**  
RT Mars atmosphere  
Mars Climate Orbiter  
Mars missions  
Mars surface  
Mars Surveyor 98 Program

### Mars Surveyor 98 Lander

USE **Mars Polar Lander**

### Mars Surveyor 98 Orbiter

USE **Mars Climate Orbiter**

### Mars Surveyor 98 Program

(added March 1999)

DEF Mars exploration program consisting of two mission spacecraft—the Mars Climate Orbiter and the Mars Polar Lander. Two surface penetrating microprobes (part of the associated Deep Space 2 mission) for detecting water ice are also piggybacking on the Lander.

GS programs  
. NASA programs  
. . NASA space programs  
. . . **Mars Surveyor 98 Program**  
. space programs  
. . NASA space programs  
. . . **Mars Surveyor 98 Program**  
RT Mars atmosphere  
Mars Climate Orbiter  
Mars missions  
Mars Polar Lander  
Mars surface

### Mars Surveyor 2001 Mission

(added July 1999)

GS space missions  
. Mars missions  
. . **Mars Surveyor 2001 Mission**  
RT Mars environment  
Mars surface  
Mars surface samples  
NASA space programs

### Martian meteorites

USE **SNC meteorites**

### massive compact halo objects

(added November 1999)

DEF Objects, such as brown dwarfs, black holes, and massive planets, hypothesized to account for the dark matter in the halo of the Milky Way. The signature of these objects is the occasional amplification of the light from extra-galactic stars by the gravitational lens effect.

UF *MACHOs (astronomy)*  
GS celestial bodies  
. **massive compact halo objects**  
RT brown dwarf stars  
dark matter  
galactic halos  
gravitational lenses  
Milky Way Galaxy  
missing mass (astrophysics)  
red dwarf stars

### MEAM (physical chemistry)

USE **embedded atom method**

### meitnerium

(added May 1998)

GS chemical elements  
. **meitnerium**  
RT hassium

### MEMS (electromechanical devices)

USE **microelectromechanical systems**

*MGS (spacecraft)*

USE **Mars Global Surveyor**

**microelectromechanical systems**

(added October 1998)

UF *MEMS (electromechanical devices)*  
 GS electromechanical devices  
 . **microelectromechanical systems**  
 RT microinstrumentation  
 microminiaturization  
 microminiaturized electronic devices  
 microsatellites  
 nanosatellites

**microsatellites**

(added October 1998)

DEF Satellites with a total mass between 10 and 100 kg often incorporating miniaturized electronic and mechanical systems.

UF *microsats*  
 GS artificial satellites  
 . **microsatellites**  
 RT microelectromechanical systems  
 microminiaturization  
 microminiaturized electronic devices  
 nanosatellites  
 satellite constellations  
 satellite design  
 small satellite technology  
 small scientific satellites

*microsats*

USE **microsatellites**

*Mindlin plate theory*

USE **Mindlin plates**

**Mindlin plates**

(added April 1998)

UF *Mindlin plate theory*  
*Reissner–Mindlin plates*  
 GS structural members  
 . plates (structural members)  
 . . **Mindlin plates**  
 RT dynamic structural analysis  
 finite element method  
 free vibration  
 plate theory  
 Reissner theory  
 shear strain  
 structural analysis  
 structural vibration  
 thick plates

**mischmetal**

(added June 1998)

DEF An alloy consisting of a natural mixture of rare–earth metals; used in electrode materials and hydrogen–storage alloys, as a general alloy addition, and in the production of some aluminum alloys and steels.

GS alloys  
 . rare earth alloys  
 . . **mischmetal**  
 RT alloying  
 aluminum alloys  
 cathodic coatings  
 cerium  
 desorption  
 electrode materials  
 intermetallics  
 steels

*modified embedded atom method*

USE **embedded atom method**

*nacelle wing configurations*

USE **wing nacelle configurations**

**nanosatellites**

(added October 1998)

DEF Satellites with a total mass smaller than 10 kg incorporating miniaturized electronic and mechanical systems.

UF *nanosats*  
 GS artificial satellites  
 . **nanosatellites**  
 RT microelectromechanical systems  
 microminiaturization  
 microminiaturized electronic devices  
 microsatellites  
 satellite constellations  
 satellite design  
 small satellite technology  
 small scientific satellites

*nanosats*

USE **nanosatellites**

**Next Generation Space Telescope project**

(added December 1999)

DEF Project in the NASA Origins program with the goal of developing a spaceborne observatory to succeed the Hubble Space Telescope after 2005. The telescope is foreseen to have an aperture of 8 meters and be optimized for near infrared wavelengths (0.6–10+ microns) in order to enable the exploration of the most remote high redshift universe.

UF *NGST project*  
 GS programs  
 . projects  
 . . **Next Generation Space Telescope project**  
 RT astronomical observatories  
 infrared telescopes  
 NASA space programs  
 spaceborne telescopes

*NGST project*

USE **Next Generation Space Telescope project**

**Nozomi Mars Orbiter**

(added August 1998)

DEF A Japanese Mars mission spacecraft designed to study the Martian upper atmosphere and its interaction with the solar wind, and to develop technologies for use in future planetary missions. Specifically, instruments on the spacecraft enable the measurement of the structure, composition and dynamics of the ionosphere; aeronomy effects of the solar wind; the escape of atmospheric constituents; the intrinsic magnetic field; and dust in the upper atmosphere and in–orbit around Mars.

UF *Planet–B spacecraft*  
 GS interplanetary spacecraft  
 . Mars probes  
 . . **Nozomi Mars Orbiter**  
 Japanese spacecraft  
 . **Nozomi Mars Orbiter**  
 unmanned spacecraft  
 . space probes  
 . . Mars probes  
 . . . **Nozomi Mars Orbiter**  
 RT aeronomy  
 Deimos  
 Phobos  
 planetary atmospheres  
 solar planetary interactions

**optical interconnects**

(added June 1998)

GS **optical interconnects**

. free–space optical interconnects  
 RT connectors  
 electric connectors  
 integrated optics  
 optical computers  
 optical switching  
 optoelectronic devices  
 photonics

**orbit determination**

(added December 1998)

GS **orbit determination**  
 . airborne range and orbit  
 determination  
 . orbit calculation  
 . . minimum variance orbit  
 determination  
 . . orbital position estimation  
 RT Global Positioning System  
 position errors  
 satellite tracking  
 space navigation  
 spacecraft control  
 spacecraft position indicators

*PDS (spectroscopy)*

USE **photothermal deflection spectroscopy**

**perfectly matched layers**

(added July 1998)

DEF In the area of computational electromagnetism, an absorbing boundary condition used for terminating infinite domain calculations in the finite–difference time–domain (FDTD) or finite element methods. The approach has also been extended to the analysis of some problems in acoustics.

UF *PML (electromagnetism)*  
 GS conditions  
 . boundary conditions  
 . . **perfectly matched layers**  
 RT computational electromagnetics  
 computational grids  
 electromagnetic absorption  
 electromagnetic scattering  
 finite difference theory  
 finite element method  
 Maxwell equation

*Phaethon (hypothetical planet)*

USE **hypothetical planets**

**Phobos spacecraft**

(added August 1998)

DEF Two Soviet spacecraft (Phobos 1 and 2, both launched in July 1988) designed to study the plasma environment in the Martian vicinity, the surface and atmosphere of Mars, and the surface composition of the Martian satellite Phobos. Other mission objectives included the study of the interplanetary environment and solar observations.

GS interplanetary spacecraft  
 . Mars probes  
 . . **Phobos spacecraft**  
 Soviet spacecraft  
 . **Phobos spacecraft**  
 unmanned spacecraft  
 . space probes  
 . . Mars probes  
 . . . **Phobos spacecraft**  
 RT Mars atmosphere  
 Mars environment  
 Phobos



## photothermal deflection spectroscopy

### photothermal deflection spectroscopy

(added November 1998)

UF *PDS (spectroscopy)*

GS spectroscopy  
. **photothermal deflection spectroscopy**

RT optical measurement  
photoacoustic spectroscopy  
thermal diffusivity  
thermal lensing

*pilot opinion ratings*

USE **pilot ratings**

### pilot ratings

(added August 1999)

DEF Subjective assessment of the handling and stability characteristics of an aircraft or other flight vehicle.

UF *pilot opinion ratings*

GS flight characteristics

. **pilot ratings**

. . Cooper–Harper ratings ratings

. **pilot ratings**

. . Cooper–Harper ratings

RT aircraft performance assessments  
controllability  
helicopter performance

*planet X*

USE **hypothetical planets**

*Planet-B spacecraft*

USE **Nozomi Mars Orbiter**

*PML (electromagnetism)*

USE **perfectly matched layers**

*polyvinylidene*

USE **vinylidene**

### Population III stars

(added July 1999)

UF *primordial stars*

GS celestial bodies

. stars

. . **Population III stars**

RT cosmology  
dark matter  
relic radiation  
stellar evolution  
supermassive stars

*primordial stars*

USE **Population III stars**

### proportional navigation

(added July 1998)

GS navigation

. **proportional navigation**

RT homing  
interception  
line of sight  
missile control  
proportional control  
rendezvous guidance  
terminal guidance

### proton–antiproton interactions

(added June 1999)

GS particle interactions

. elementary particle interactions

. . **proton–antiproton interactions**

RT annihilation reactions  
antiprotons  
high energy interactions  
matter–antimatter propulsion

### pursuit–evasion games

(added October 1998)

GS games

. **pursuit–evasion games**

RT differential games  
evasive actions  
interception  
optimal control  
pursuit tracking  
trajectory optimization  
zero sum games

*RBCC engines*

USE **rocket–based combined–cycle engines**

*Reissner–Mindlin plates*

USE **Mindlin plates**

### renewable energy

(added December 1998)

GS **renewable energy**

. geothermal energy utilization

. hydroelectricity

. tidepower

. waterwave energy

. windpower utilization

RT bioconversion  
biomass energy production  
clean energy  
energy policy

∞ energy sources

energy technology

geothermal energy conversion

hydrogen–based energy

ocean thermal energy conversion

solar energy conversion

waste utilization

waterwave energy conversion

### Ringleb flow

(added July 1998)

GS fluid flow

. compressible flow

. . **Ringleb flow**

. steady flow

. . **Ringleb flow**

. two dimensional flow

. . **Ringleb flow**

RT critical flow  
subsonic flow  
transonic flow

### rocket–based combined–cycle engines

(added August 1999)

DEF Launch vehicle engines that integrate a high specific impulse, low thrust-to-weight, airbreathing engine with a low-impulse, high thrust-to-weight rocket. The engines are often defined by four modes of operation in a single-stage-to-orbit configuration. In the first mode, the engine functions as a rocket-driven ejector. When the rocket engine is switched off, subsonic combustion (mode 2) is present in the ramjet mode. As the vehicle continues to accelerate, supersonic combustion (mode 3) occurs in the ramjet mode. Finally, as the edge of the atmosphere is approached and the engine inlet is closed off, the rocket is reignited and the final ascent to orbit is undertaken in an all-rocket mode (mode 4).

UF *RBCC engines*

GS engines

. rocket engines

. . **rocket–based combined–cycle engines**

RT air breathing boosters  
air breathing engines

hybrid propulsion  
integral rocket ramjets  
ramjet engines  
single stage to orbit vehicles  
spacecraft propulsion  
supersonic combustion ramjet engines

*Rossi X Ray Timing Explorer*

USE **X Ray Timing Explorer**

*RXTE (satellite)*

USE **X Ray Timing Explorer**

### scarf joints

(added March 1998)

DEF A joint in which the overlapping parts are tapered to form a continuous length, with no increase in dimension at the joint.

GS joints (junctions)

. **scarf joints**

RT bolted joints

bonded joints

lap joints

metal joints

scarfing

### scene generation

(added July 1998)

GS imaging techniques

. **scene generation**

simulation

. **scene generation**

RT computer graphics

flight simulation

image reconstruction

scientific visualization

target simulators

### screech tones

(added March 1998)

DEF Discrete acoustic tones produced by imperfectly expanded supersonic jets. The phenomenon is a result of a resonant feedback condition involving downstream traveling shear-layer disturbances and upstream traveling acoustic waves.

GS elastic waves

. sound waves

. . noise (sound)

. . . aerodynamic noise

. . . . **screech tones**

frequencies

. acoustic frequencies

. . **screech tones**

RT aeroacoustics

feedback

jet aircraft noise

jet mixing flow

nozzle flow

shear layers

supersonic jet flow

supersonic nozzles

### seaborgium

(added May 1998)

GS chemical elements

. **seaborgium**

RT bohrium

dubnium

### Sea-viewing Wide Field-of-view Sensor

(added December 1998)

UF *SeaWiFS*

GS scanners

. ocean color scanner

. . **Sea-viewing Wide Field-of-view Sensor**

RT chlorophylls

Coastal Zone Color Scanner  
ocean surface  
phytoplankton  
remote sensors  
satellite-borne instruments  
water color

#### SeaWiFS

USE **Sea-viewing Wide Field-of-view  
Sensor**

#### Service Module (ISS)

(added March 1999)

DEF Primary Russian component of the International Space Station providing an early station living quarters and life support system functions to all early elements. Also provides propulsive attitude control and reboost capability for the early station.

GS modules  
. space station modules  
. . **Service Module (ISS)**  
RT International Space Station  
life support systems

#### Shergotty Nakhla Chassigny meteorites

USE **SNC meteorites**

#### Shuttle Superlightweight Tank

USE **external tanks  
propellant tanks**

#### SLWT (propellant tank)

USE **external tanks  
propellant tanks**

#### smart materials

(added March 1998)

DEF Engineered materials capable of responding to their environment to a significant degree, by virtue of intrinsic properties and/or built-in sensor/actuator elements. Applications of these materials include vibration suppression/isolation, precision positioning, damage detection, and tunable devices.

UF *intelligent materials*  
RT actuators  
composite materials  
electrorheological fluids  
electrostriction  
ferroelastic materials  
ferroelasticity  
ferroelectric materials  
ferromagnetic materials  
∞ materials  
piezoelectric ceramics  
∞ sensors  
shape memory alloys  
smart structures  
vibration damping

#### SNC meteorites

(added March 1998)

DEF Meteorites with petrologic characteristics, isotopic signatures, trapped gas compositions, and relatively young crystallization ages (less than 1.3 billion years), which together point to a Martian origin. The name of these meteorites is derived from first three known examples—Shergotty, Nakhla, and Chassigny.

UF *Martian meteorites*  
*Shergotty Nakhla Chassigny meteorites*  
GS celestial bodies  
. meteorites  
. . stony meteorites  
. . . achondrites  
. . . **SNC meteorites**  
RT chassignites

Mars (planet)  
Mars surface  
nakhlites  
shergottites

#### sonochemistry

USE **ultrasonic processing**

#### space station modules

(added November 1998)

GS modules  
. **space station modules**  
. . Kvant modules  
. . Priroda module  
. . Service Module (ISS)  
. . Unity connecting module  
. . Zarya control module  
RT air locks  
compartments  
International Space Station  
Mir space station  
orbital assembly  
space erectable structures  
space station structures  
spacecraft modules

#### space tourism

(added April 1999)

GS space industrialization  
. **space tourism**  
tourism  
. **space tourism**  
RT space commercialization  
space transportation

#### space weather

(added June 1999)

SN (FOR METEOROLOGICAL CONDITIONS RELATED TO THE MIDDLE AND LOWER ATMOSPHERES OF NON-EARTH PLANETS USE "PLANETARY METEOROLOGY").  
DEF The dynamic, highly variable conditions of the geospace environment that encompasses the sun, the interplanetary medium, and the Earth magnetosphere-ionosphere-thermosphere system. Major contributing factors include variations in the solar wind, solar flares, and solar mass ejections. Effects of space weather phenomena include performance degradation of communication, navigation, and power systems on both spacecraft and ground-based systems; and potential health hazards during extravehicular activity.  
RT Advanced Composition Explorer  
aerospace environments  
aerospace safety  
Earth ionosphere  
Earth magnetosphere  
Earth orbital environments  
geomagnetism  
ionospheric disturbances  
magnetic disturbances  
magnetic storms  
radiation hazards  
solar activity effects  
solar terrestrial interactions  
space plasmas  
weather

#### spiral bevel gears

(added May 1999)

GS gears  
. bevel gears  
. . **spiral bevel gears**

#### Stardust Mission

(added March 1999)

DEF First U.S. mission launched to robotically obtain samples in deep space and return them to Earth. The NASA Discovery-class mission will

return dust samples collected from the debris cloud surrounding the nucleus of Comet Wild 2. Interstellar dust will also be collected. The mission spacecraft takes advantage of an Earth gravity-assist maneuver to reach the comet, and uses an aerogel-based dust collector.

GS space missions  
. flyby missions  
. . **Stardust Mission**  
RT comet nuclei  
interstellar matter  
Wild 2 comet

#### stepped leaders

(added August 1999)

GS electric current  
. electric discharges  
. . lightning  
. . . leaders (meteorology)  
. . . **stepped leaders**

#### superhumps (astronomy)

(added October 1998)

RT accretion disks  
astronomical photometry  
binary stars  
cataclysmic variables  
dwarf novae  
eclipsing binary stars  
stellar spectrophotometry

#### Terra spacecraft

(added June 1999)

DEF First in a series of EOS (Earth Observing System) spacecraft developed to advance the understanding of the ways that the Earth's lands, oceans, air, ice, and life function as a total environmental system. The spacecraft carries five high-resolution instruments: the Advanced Spaceborne Thermal Emission Radiometer (ASTER), the Clouds and the Earth Radiant Energy System (CERES), the Multi-Angle Imaging Spectroradiometer (MISR), the Moderate Resolution Imaging Spectroradiometer (MODIS), and the Measurements of Pollution in the Troposphere (MOPITT) instrument.

UF *AM-1 (EOS) spacecraft*  
*EOS AM-1 spacecraft*  
GS artificial satellites  
. **Terra spacecraft**  
Earth Observing System (EOS)  
. **Terra spacecraft**  
RT Earth observations (from space)  
remote sensing

#### thermal lenses

USE **thermal lensing**

#### thermal lensing

(added November 1998)

UF *thermal lenses*  
GS **thermal lensing**  
. thermal blooming  
RT atmospheric optics  
focusing  
laser beams  
photothermal deflection spectroscopy  
wave front deformation

#### thermocapillary migration

(added September 1999)

DEF Phenomenon where droplets (or bubbles) in a host fluid with a uniform temperature gradient migrate to the hot end of the host fluid because of the temperature dependence of the interfacial energy of the droplets.

RT bubbles  
capillary flow

## time domain analysis

drops (liquids)  
electromigration  
interfacial tension  
Marangoni convection  
microgravity  
space processing  
temperature gradients  
thermomigration

### time domain analysis

(added April 1999)

GS analysis (mathematics)  
  . **time domain analysis**  
    . . finite difference time domain method  
RT control systems design  
dynamic response  
parameter identification  
signal processing  
∞ time response

### time synchronization

(added December 1998)

GS synchronism  
  . **time synchronization**  
RT clocks  
frequency standards  
frequency synchronization  
Global Positioning System  
time measurement  
time signals  
universal time

### Titan 4B launch vehicle

(added October 1998)

GS launch vehicles  
  . Titan launch vehicles  
  . . Titan 4 launch vehicle  
  . . . **Titan 4B launch vehicle**  
rocket vehicles  
  . multistage rocket vehicles  
  . . Titan launch vehicles  
  . . . Titan 4 launch vehicle  
  . . . . **Titan 4B launch vehicle**  
RT Cassini mission  
laser gyroscopes

### tourism

(added April 1999)

GS **tourism**  
  . space tourism  
RT industries  
recreation  
transportation  
∞ travel

### TRACE satellite

USE **Transition Region and Coronal Explorer**

### Transition Region and Coronal Explorer

(added May 1998)

DEF Small Explorer Mission satellite supporting the investigation of the relationships between fine-scale magnetic fields and their associated plasma structures in the transition region and lower corona of the Sun.

UF *TRACE satellite*  
GS artificial satellites  
  . scientific satellites  
  . . Explorer satellites  
  . . . **Transition Region and Coronal Explorer**  
RT chromosphere  
SOHO Mission  
solar atmosphere  
solar corona  
solar magnetic field

solar observatories  
solar physics  
solar transition region

### transplutonic planets

USE **hypothetical planets**

### transverse momentum

(added June 1999)

GS momentum  
  . **transverse momentum**  
RT angular momentum  
elementary particle interactions  
particle motion  
transverse acceleration

### Trefftz method

(added July 1998)

DEF Boundary-type approximation scheme for the solution of boundary value problems for partial differential equations.

UF *hybrid-Trefftz finite element method*  
GS analysis (mathematics)  
  . numerical analysis  
  . . approximation  
  . . . boundary element method  
  . . . . **Trefftz method**  
RT bending theory  
boundary conditions  
boundary value problems  
finite element method  
partial differential equations  
plate theory  
structural analysis

### TRMM satellite

(added May 1998)

DEF Satellite supporting the joint US-Japanese Tropical Rainfall Measuring Mission (TRMM) to explore tropical rainfall and its effects on the Earth energy budget, general circulation, and climate. The TRMM satellite represents the first dual deployment of a precipitation radar and passive microwave radiometer on an Earth-viewing satellite.

UF *Tropical Rainfall Measuring Mission sat*  
GS artificial satellites  
  . meteorological satellites  
  . . **TRMM satellite**  
  . . scientific satellites  
  . . . **TRMM satellite**  
RT atmospheric circulation  
Earth radiation budget  
equatorial atmosphere  
rain  
tropical meteorology

### Tropical Rainfall Measuring Mission sat

USE **TRMM satellite**

### Ukrainian space program

(added January 1999)

GS programs  
  . space programs  
  . . **Ukrainian space program**  
RT Ukraine  
Zenit launch vehicles

### ultrasonic processing

(added June 1998)

DEF The use of ultrasonic radiation to synthesize a compound or material, or alter the structure, properties, or form of a material.

UF *sonochemistry*  
*ultrasonic treatment*  
RT ∞ processing  
ultrasonic cleaning

ultrasonics

### ultrasonic treatment

USE **ultrasonic processing**

### undercooling

USE **supercooling**

### Unity connecting module

(added November 1998)

DEF Component of the International Space Station providing six ports that serve as connecting points for other station modules and framework elements.

GS modules  
  . space station modules  
  . . **Unity connecting module**  
RT International Space Station  
spacecraft docking

### VentureStar launch vehicle

(added June 1999)

DEF Reusable single-stage-to-orbit launch vehicle employing linear aerospike engines, and having a payload capacity roughly equivalent to that of the Space Shuttle; developed in coordination with the X-33 advanced technology demonstrator vehicle.

GS aerospace vehicles  
  . aerospace planes  
  . . **VentureStar launch vehicle**  
maneuverable spacecraft  
  . aerospace planes  
  . . **VentureStar launch vehicle**  
manned spacecraft  
  . aerospace planes  
  . . **VentureStar launch vehicle**  
reentry vehicles  
  . recoverable spacecraft  
  . . reusable spacecraft  
  . . . aerospace planes  
  . . . . **VentureStar launch vehicle**  
soft landing spacecraft  
  . aerospace planes  
  . . **VentureStar launch vehicle**  
RT aerospike engines  
commercial spacecraft  
X-33 reusable launch vehicle

### very large transport aircraft

(added November 1998)

DEF Aircraft capable of a maximum takeoff weight greater than 400 metric tons (881,600 lbs) or having a seating capacity greater than 660.

UF *VLTA (aircraft)*  
GS transport aircraft  
  . **very large transport aircraft**  
RT cargo aircraft  
passenger aircraft

### VLTA (aircraft)

USE **very large transport aircraft**

### water sampling

(added March 1998)

DEF The process of obtaining a representative sample of water from any natural or artificial environment.

GS sampling  
  . **water sampling**  
RT environmental monitoring  
ground water  
pollution monitoring  
sea water  
surface water  
water

water pollution  
water quality

#### wave rotors

(added March 1998)

DEF Rotor devices that use gasdynamic waves to transfer energy rather than the motion of solid surfaces. Typically, they consist of a series of passages arranged on a drum which rotates about an axis. Through rotation, the ends of the passages are periodically exposed to various circumferentially arranged ports which initiate the traveling expansion or compression waves within the passages. The particular circumferential location of the ports determines the thermodynamic cycle of the working fluid.

GS rotating bodies

. rotors

. . **wave rotors**

RT compression waves

energy transfer

engine parts

gas dynamics

gas generators

gas turbine engines

topping cycle engines

turbomachinery

turboshafts

wave generation

#### weakly interacting massive particles

(added November 1999)

DEF Hypothetical elementary particles predicted by supersymmetry theories, that interact only through gravity and weak-type interactions; postulated to account for dark matter in the Universe.

UF *cosmions*

*WIMPs (astronomy)*

GS particles

. elementary particles

. . hypothetical particles

. . . **weakly interacting massive particles**

RT dark matter

missing mass (astrophysics)

solar neutrinos

#### WIG vehicles

USE **wing-in-ground effect vehicles**

#### Wild 2 comet

(added March 1999)

DEF Periodic comet, discovered January 1978, relatively new to the inner Solar System due to a shift in its orbit caused by the gravitational influence of Jupiter.

GS celestial bodies

. comets

. . **Wild 2 comet**

RT Stardust Mission

#### WIMPs (astronomy)

USE **weakly interacting massive particles**

#### wing-body and tail configurations

USE **body-wing and tail configurations**

#### wing-body configurations

USE **body-wing configurations**

#### wing-in-ground effect vehicles

(added December 1999)

DEF Vehicles designed to fly about half their mean chord above the surface, taking advantage of the reduced drag and increased lift caused by ground effect. These vehicles, also known as

WIGs or WIGEs, normally operate above a water surface.

UF *ekranoplanes*

*WIG vehicles*

GS ground effect machines

. **wing-in-ground effect vehicles**

RT ground effect (aerodynamics)

surface effect ships

#### X-32 aircraft

(added October 1998)

DEF Experimental supersonic strike fighter developed to be configured as a conventional or short takeoff/vertical landing vehicle. Developed as part of the Joint Strike Fighter (JSF) program.

GS Boeing aircraft

. **X-32 aircraft**

jet aircraft

. **X-32 aircraft**

research vehicles

. research aircraft

. . **X-32 aircraft**

supersonic aircraft

. **X-32 aircraft**

V/STOL aircraft

. **X-32 aircraft**

#### X-35 aircraft

(added October 1998)

DEF Experimental strike fighter incorporating a vertical lift fan for short takeoff/vertical landing capability. Developed as part of the Joint Strike Fighter (JSF) program.

GS jet aircraft

. **X-35 aircraft**

Lockheed aircraft

. **X-35 aircraft**

research vehicles

. research aircraft

. . **X-35 aircraft**

V/STOL aircraft

. **X-35 aircraft**

#### X-43 vehicle

(added September 1999)

DEF The experimental research vehicle of the NASA Hyper-X program designed to flight validate key propulsion and related technologies for air-breathing hypersonic aircraft.

GS aerospace vehicles

. **X-43 vehicle**

hypersonic vehicles

. **X-43 vehicle**

research vehicles

. **X-43 vehicle**

RT hypersonic flight

Pegasus air-launched booster

supersonic combustion ramjet engines

#### Zarya control module

(added November 1998)

DEF Component of the International Space Station providing propulsion, steering, and communications during the early assembly stages of the station; later serving as a docking port and fuel tank. Zarya was built by Russia under contract to the U.S. and is owned by the U.S.

GS modules

. space station modules

. . **Zarya control module**

RT International Space Station

#### Zenit launch vehicles

(added January 1999)

GS launch vehicles

. **Zenit launch vehicles**

RT sea launching

Ukrainian space program

#### zero sum games

(added October 1998)

GS games

. **zero sum games**

RT differential games

Markov processes

optimal control

pursuit-evasion games

saddle points (game theory)



# NASA THESAURUS SUPPLEMENT

## PART 2 ROTATED TERM DISPLAY

### NUMERALS

AM- **1** (EOS) spacecraft  
*use* Terra spacecraft

Deep Space **1** Mission

EOS AM- **1** spacecraft  
*use* Terra spacecraft

Wild **2** comet

H- **2** control

Delta **3** launch vehicle

Delta **4** launch vehicle

Titan **4B** launch vehicle

X- **32** aircraft

X- **35** aircraft

X- **43** vehicle

Mars Surveyor **98** Lander  
*use* Mars Polar Lander

Mars Surveyor **98** Orbiter  
*use* Mars Climate Orbiter

Mars Surveyor **98** Program

Boeing **717** aircraft

Mars Surveyor **2001** Mission

**A**

**ACE** satellite  
*use* Advanced Composition Explorer

content- **addressable** memory  
*use* associative memory

**Advanced** Composition Explorer

Darkstar unmanned **aerial** vehicle  
*use* pilotless aircraft  
*use* reconnaissance aircraft

**aeroshells**

Boeing 717 **aircraft**

very large transport **aircraft**

VLTA **(aircraft)**  
*use* very large transport aircraft

X-32 **aircraft**

X-35 **aircraft**

**Alpha** Magnetic Spectrometer

**AM-1** (EOS) spacecraft  
*use* Terra spacecraft

EOS **AM-1** spacecraft  
*use* Terra spacecraft

**AMS** (spectrometer)  
*use* Alpha Magnetic Spectrometer

frequency domain **analysis**

time domain **analysis**

**anisoplanatism**

**antenna** gain

**antiphase** boundaries

**antiphase** domains  
*use* antiphase boundaries

proton- **antiproton** interactions

**APB** (materials)  
*use* antiphase boundaries

**archaeomagnetism**  
*use* paleomagnetism

**associative** memory

**associative** storage  
*use* associative memory

MACHOs **(astronomy)**  
*use* massive compact halo objects

superhumps **(astronomy)**

WIMPs **(astronomy)**  
*use* weakly interacting massive particles

Chandra X Ray **Astrophysics** Facility  
*use* X Ray Astrophysics Facility

embedded **atom** method

modified embedded **atom** method  
*use* embedded atom method

### B

Planet- **B** spacecraft  
*use* Nozomi Mars Orbiter

kink **bands**

rocket- **based** combined-cycle engines

lithium **batteries**

Euler-Bernoulli **beam** theory  
*use* Euler-Bernoulli beams

Euler-Bernoulli **beams**

Euler- **Bernoulli** beam theory  
*use* Euler-Bernoulli beams

Euler- **Bernoulli** beams

**bevel** gears

spiral **bevel** gears

**biomass** burning

**Biot-Savart** law

wing- **body** and tail configurations  
*use* body-wing and tail configurations

wing- **body** configurations  
*use* body-wing configurations

**Boeing** 717 aircraft

**bohrium**

**Bond** number

Hale- **Bopp** comet

antiphase **boundaries**

biomass **burning**

### C

digital **cameras**

**cascode** devices

**chain** reactions (chemistry)

**chain** reactions (nuclear physics)

**Chandra** X Ray Astrophysics Facility  
*use* X Ray Astrophysics Facility

Shergotty Nakhla **Chassigny** meteorites  
*use* SNC meteorites

chain reactions **(chemistry)**

EAM (physical **chemistry)**  
*use* embedded atom method

MEAM (physical **chemistry)**  
*use* embedded atom method

**clamped** structures

environmental **cleanup**

Mars **Climate** Orbiter

cloud-to- **cloud** discharges

rocket-based **cloud**–to–ground discharges  
 Hale–Bopp **combined**–cycle engines  
 Wild 2 **comet**  
**Comet** Nucleus Tour  
 free-space optical **communication**  
 massive **compact** halo objects  
 Advanced **Composition** Explorer  
 enantiomeric **compounds**  
*use* enantiomers  
 nacelle wing **configurations**  
*use* wing nacelle configurations  
 wing-body **configurations**  
*use* body-wing configurations  
 wing-body and tail **configurations**  
*use* body-wing and tail configurations  
 Unity **connecting** module  
**content**–addressable memory  
*use* associative memory  
**CONTOUR** (mission)  
*use* Comet Nucleus Tour  
 H-2 **control**  
 Zarya **control** module  
**Cooper**–Harper ratings  
 Transition Region and **Coronal** Explorer  
**corrugated** waveguides  
**cosmions**  
*use* weakly interacting massive particles  
**critical** current  
**cuprates**  
 critical **current**  
 rocket-based combined-**cycle** engines  
**cycloaddition**

## D

**Darkstar** unmanned aerial vehicle  
*use* pilotless aircraft  
 reconnaissance aircraft  
 photothermal **Deep** Space 1 Mission  
**deflection** spectroscopy  
**deformable** mirrors  
**Delta** 3 launch vehicle  
**Delta** 4 launch vehicle  
 orbit **determination**  
 cascode **devices**  
 MEMS (electromechanical **devices**)  
*use* microelectromechanical systems  
**dielectric** waveguides  
 finite **difference** time domain method  
**differential** games  
**digital** cameras  
 cloud-to-cloud **discharges**  
 cloud-to-ground **discharges**  
 intracloud **discharges**  
 frequency **domain** analysis  
 time **domain** analysis  
 finite difference time **domain** method  
 antiphase **domains**  
*use* antiphase boundaries  
**DS1** (space mission)  
*use* Deep Space 1 Mission  
**dubnium**

## E

**EAM** (physical chemistry)  
*use* embedded atom method  
 Josephson **effect**  
 wing-in-ground **effect** vehicles  
**ekranoplanes**  
*use* wing-in-ground effect vehicles  
 PML **(electromagnetism)**  
*use* perfectly matched layers  
 MEMS **(electromechanical)** devices  
*use* microelectromechanical systems  
**electronic** structure  
 hybrid-Trefftz finite **element** method  
*use* finite element method  
 Trefftz method  
**embedded** atom method  
 modified **embedded** atom method  
*use* embedded atom method  
**enantiomeric** compounds  
*use* enantiomers  
**enantiomers**  
**enantiomorphs**  
*use* enantiomers  
 renewable **energy**  
 RBCC **engines**  
*use* rocket-based combined-cycle engines  
 rocket-based combined-cycle **engines**  
**environmental** cleanup  
 AM-1 **(EOS)** spacecraft  
*use* Terra spacecraft  
**EOS** AM-1 spacecraft  
*use* Terra spacecraft  
**Euler**–Bernoulli beam theory  
*use* Euler–Bernoulli beams  
**Euler**–Bernoulli beams  
**evanescent** waves  
 pursuit-**evasion** games  
 Advanced Composition **Explorer**  
 Rossi X Ray Timing **Explorer**  
*use* X Ray Timing Explorer  
 Transition Region and Coronal **Explorer**

## F

Chandra X Ray Astrophysics **Facility**  
*use* X Ray Astrophysics Facility  
**FDTD** (mathematics)  
*use* finite difference time domain method  
 heavy **fermion** superconductors  
 heavy **fermion** systems  
**ferroelastic** materials  
**ferroelasticity**  
**fiber** pushout  
 Sea-viewing Wide **Field**–of-view Sensor  
**field** tests  
 Gabor **filters**  
**finite** difference time domain method  
 hybrid-Trefftz **finite** element method  
*use* finite element method  
 Trefftz method  
 in-**flight** simulation  
 Ringleb **flow**  
**free**–space optical communication  
**free**–space optical interconnects  
**frequency** domain analysis

**FSOI** (integrated optics)  
*use* free-space optical interconnects

**fullerides**

**fuselage**—wing stores  
*use* wing-fuselage stores

**fusion** propulsion

**G**

**Gabor** filters

**Gabor** transformation

antenna **gain**

**games**

differential **games**

pursuit-evasion **games**

zero sum **games**

bevel **gears**

spiral bevel **gears**

scene **generation**

Next **Generation** Space Telescope project

**Genesis** mission

Mars **Global** Surveyor

**glucocorticoids**

**Godunov** method

cloud-to- **ground** discharges

wing-in- **ground** effect vehicles

**H**

**H-2** control

**Hale-Bopp** comet

massive compact **halo** objects

**hardware**—in-the-loop simulation

**hardware**—in-the-loop tests  
*use* hardware-in-the-loop simulation

Cooper- **Harper** ratings

**hassium**

**head** up tilt

**heavy** fermion superconductors

**heavy** fermion systems

**heavy** metals

**hindcasting**

**HUT** (physiology)  
*use* head up tilt

**hybrid**—Trefftz finite element method  
*use* finite element method  
 Trefftz method

**hypothetical** particles

Phaethon (**hypothetical** planet)  
*use* hypothetical planets

**hypothetical** planets

**I**

Population **III** stars

**inflight** simulation  
*use* in-flight simulation

FSOI (**integrated** optics)  
*use* free-space optical interconnects

**intelligent** materials  
*use* smart materials

weakly **interacting** massive particles

proton-antiproton **interactions**

**intercalibration**

free-space optical **interconnects**

optical **interconnects**

**intracloud** discharges

**ion** optics

**Iridium** network

**Iridium** satellites  
*use* communication satellites  
 Iridium network

Service Module (**ISS**)

**J**

**Java** (programming language)

scarf **joints**

**Josephson** effect

**Josephson** tunneling  
*use* Josephson effect

**K**

**kink** bands

**kinking**

**L**

Mars Polar **Lander**

Mars Surveyor 98 **Lander**  
*use* Mars Polar Lander

Java (programming **language**)

very **large** transport aircraft

Delta 3 **launch** vehicle

Delta 4 **launch** vehicle

Titan 4B **launch** vehicle

VentureStar **launch** vehicle

Long March **launch** vehicles

Zenit **launch** vehicles

**Laves** phases

Biot-Savart **law**

perfectly matched **layers**

stepped **leaders**

**leaders** (meteorology)

thermal **lenses**  
*use* thermal lensing

thermal **lensing**

**lithium** batteries

**Long** March launch vehicles

hardware-in-the- **loop** simulation

hardware-in-the- **loop** tests

**Lunar** Prospector

**M**

**MACHOs** (astronomy)  
*use* massive compact halo objects

**magnetic** nozzles

Alpha **Magnetic** Spectrometer

**magnetostigraphy**

Long **March** launch vehicles

**Mars** Climate Orbiter

**Mars** Global Surveyor

**Mars** missions

Nozomi **Mars** Orbiter

**Mars** Polar Lander

**Mars** Surveyor 98 Lander  
*use* Mars Polar Lander

**Mars** Surveyor 98 Orbiter  
*use* Mars Climate Orbiter

**Mars** Surveyor 98 Program

**Mars** Surveyor 2001 Mission

**Martian** meteorites  
*use* SNC meteorites

**massive** compact halo objects

**massive** particles

weakly interacting **matched** layers

perfectly **(materials)**  
*use* antiphase boundaries

APB

|                               |   |
|-------------------------------|---|
| ferroelastic                  | <b>materials</b>                                |
| intelligent                   | <b>materials</b>                                |
|                               | <i>use</i> smart materials                      |
| smart                         | <b>materials</b>                                |
| FDTD                          | <b>(mathematics)</b>                            |
|                               | <i>use</i> finite difference time domain method |
|                               | <b>MEAM</b> (physical chemistry)                |
|                               | <i>use</i> embedded atom method                 |
| Tropical Rainfall             | <b>Measuring</b> Mission sat                    |
|                               | <i>use</i> TRMM satellite                       |
|                               | <b>meitnerium</b>                               |
| associative                   | <b>memory</b>                                   |
| content-addressable           | <b>memory</b>                                   |
|                               | <i>use</i> associative memory                   |
|                               | <b>MEMS</b> (electromechanical devices)         |
|                               | <i>use</i> microelectromechanical systems       |
| heavy                         | <b>metals</b>                                   |
| Martian                       | <b>meteorites</b>                               |
|                               | <i>use</i> SNC meteorites                       |
| Shergotty Nakhla Chassigny    | <b>meteorites</b>                               |
|                               | <i>use</i> SNC meteorites                       |
| SNC                           | <b>meteorites</b>                               |
| leaders                       | <b>(meteorology)</b>                            |
| embedded atom                 | <b>method</b>                                   |
| finite difference time domain | <b>method</b>                                   |
| Godunov                       | <b>method</b>                                   |
| hybrid-Trefftz finite element | <b>method</b>                                   |
|                               | <i>use</i> finite element method                |
|                               | Trefftz method                                  |
| modified embedded atom        | <b>method</b>                                   |
|                               | <i>use</i> embedded atom method                 |
| Trefftz                       | <b>method</b>                                   |
| in vitro                      | <b>methods</b> and tests                        |
| in vivo                       | <b>methods</b> and tests                        |
|                               | <b>MGS</b> (spacecraft)                         |
|                               | <i>use</i> Mars Global Surveyor                 |
|                               | <b>microelectromechanical</b> systems           |
|                               | <b>microsatellites</b>                          |
|                               | <b>microsats</b>                                |
|                               | <i>use</i> microsatellites                      |
| thermocapillary               | <b>migration</b>                                |
|                               | <b>Mindlin</b> plate theory                     |
|                               | <i>use</i> Mindlin plates                       |
|                               | <b>Mindlin</b> plates                           |
| Reissner-                     | <b>Mindlin</b> plates                           |
|                               | <i>use</i> Mindlin plates                       |
| deformable                    | <b>mirrors</b>                                  |
|                               | <b>mischmetal</b>                               |
| CONTOUR                       | <b>(mission)</b>                                |
|                               | <i>use</i> Comet Nucleus Tour                   |
| Deep Space 1                  | <b>Mission</b>                                  |
| DS1 (space                    | <b>mission)</b>                                 |
|                               | <i>use</i> Deep Space 1 Mission                 |
| Genesis                       | <b>mission</b>                                  |
| Mars Surveyor 2001            | <b>Mission</b>                                  |
| Stardust                      | <b>Mission</b>                                  |
| Tropical Rainfall Measuring   | <b>Mission</b> sat                              |
|                               | <i>use</i> TRMM satellite                       |
| Mars                          | <b>missions</b>                                 |
|                               | <b>modified</b> embedded atom method            |
|                               | <i>use</i> embedded atom method                 |
| Unity connecting              | <b>module</b>                                   |
| Zarya control                 | <b>module</b>                                   |
| Service                       | <b>Module</b> (ISS)                             |
| space station                 | <b>modules</b>                                  |
| transverse                    | <b>momentum</b>                                 |

## N

|                 |  |
|-----------------|--|
|                 | <b>nacelle</b> wing configurations                 |
|                 | <i>use</i> wing nacelle configurations             |
| Shergotty       | <b>Nakhla</b> Chassigny meteorites                 |
|                 | <i>use</i> SNC meteorites                          |
|                 | <b>nanosatellites</b>                              |
|                 | <b>nanosats</b>                                    |
|                 | <i>use</i> nanosatellites                          |
| proportional    | <b>navigation</b>                                  |
| Iridium         | <b>network</b>                                     |
|                 | <b>Next</b> Generation Space Telescope project     |
|                 | <b>NGST</b> project                                |
|                 | <i>use</i> Next Generation Space Telescope project |
|                 | <b>Nozomi</b> Mars Orbiter                         |
| magnetic        | <b>nozzles</b>                                     |
| chain reactions | <b>(nuclear</b> physics)                           |
| Comet           | <b>Nucleus</b> Tour                                |
| Bond            | <b>number</b>                                      |

## O

|                      |   |
|----------------------|---|
| massive compact halo | <b>objects</b>                              |
| pilot                | <b>opinion</b> ratings                      |
|                      | <i>use</i> pilot ratings                    |
| free-space           | <b>optical</b> communication                |
|                      | <b>optical</b> interconnects                |
| free-space           | <b>optical</b> interconnects                |
| FSOI (integrated     | <b>optics)</b>                              |
|                      | <i>use</i> free-space optical interconnects |
| ion                  | <b>optics</b>                               |
|                      | <b>orbit</b> determination                  |
| Mars Climate         | <b>Orbiter</b>                              |
| Mars Surveyor 98     | <b>Orbiter</b>                              |
|                      | <i>use</i> Mars Climate Orbiter             |
| Nozomi Mars          | <b>Orbiter</b>                              |

## P

|                            |   |
|----------------------------|---|
| hypothetical               | <b>particles</b>                                |
| weakly interacting massive | <b>particles</b>                                |
|                            | <b>PDS</b> (spectroscopy)                       |
|                            | <i>use</i> photothermal deflection spectroscopy |
|                            | <b>perfectly</b> matched layers                 |
|                            | <b>Phaethon</b> (hypothetical planet)           |
|                            | <i>use</i> hypothetical planets                 |
| Laves                      | <b>phases</b>                                   |
|                            | <b>Phobos</b> spacecraft                        |
|                            | <b>photothermal</b> deflection spectroscopy     |
| EAM                        | <b>(physical</b> chemistry)                     |
|                            | <i>use</i> embedded atom method                 |
| MEAM                       | <b>(physical</b> chemistry)                     |
|                            | <i>use</i> embedded atom method                 |
| chain reactions (nuclear   | <b>physics)</b>                                 |
| HUT                        | <b>(physiology)</b>                             |
|                            | <i>use</i> head up tilt                         |
|                            | <b>pilot</b> opinion ratings                    |
|                            | <i>use</i> pilot ratings                        |
|                            | <b>pilot</b> ratings                            |
| Phaethon (hypothetical     | <b>planet)</b>                                  |
|                            | <i>use</i> hypothetical planets                 |
|                            | <b>Planet-B</b> spacecraft                      |
|                            | <i>use</i> Nozomi Mars Orbiter                  |
|                            | <b>planet</b> X                                 |
|                            | <i>use</i> hypothetical planets                 |
| hypothetical               | <b>planets</b>                                  |

transplutonic **planets**  
*use* hypothetical planets

Mindlin **plate** theory  
*use* Mindlin plates

Mindlin **plates**

Reissner–Mindlin **plates**  
*use* Mindlin plates

**PML** (electromagnetism)  
*use* perfectly matched layers

Mars **Polar** Lander

**polyvinylidene**  
*use* vinylidene

**Population III** stars

**primordial** stars  
*use* Population III stars

ultrasonic **processing**

Mars Surveyor 98 **Program**

Ukrainian space **program**

Java **(programming** language)

Next Generation Space Telescope **project**

NGST **project**  
*use* Next Generation Space Telescope project

SLWT **(propellant** tank)  
*use* external tanks  
 propellant tanks

**proportional** navigation

fusion **propulsion**

Lunar **Prospector**

**proton**–antiproton interactions

**pursuit**–evasion games

fiber **pushout**

## R

Tropical **Rainfall** Measuring Mission sat  
*use* TRMM satellite

Cooper–Harper **ratings**

pilot **ratings**

pilot opinion **ratings**  
*use* pilot ratings

Chandra X **Ray** Astrophysics Facility  
*use* X Ray Astrophysics Facility

Rossi X **Ray** Timing Explorer  
*use* X Ray Timing Explorer

**RBCC** engines  
*use* rocket–based combined-cycle engines

chain **reactions** (chemistry)

chain **reactions** (nuclear physics)

Transition **Region** and Coronal Explorer

**Reissner**–Mindlin plates  
*use* Mindlin plates

**renewable** energy

**Ringleb** flow

**rocket**–based combined-cycle engines

**Rossi** X Ray Timing Explorer  
*use* X Ray Timing Explorer

wave **rotors**

**RXTE** (satellite)  
*use* X Ray Timing Explorer

## S

water **sampling**

Tropical Rainfall Measuring Mission **sat**  
*use* TRMM satellite

ACE **satellite**  
*use* Advanced Composition Explorer

RXTE **(satellite)**  
*use* X Ray Timing Explorer

TRACE **satellite**  
*use* Transition Region and Coronal Explorer

TRMM **satellite**

Iridium **satellites**  
*use* communication satellites  
 Iridium network

Biot–**Savart** law

**scarf** joints

**scene** generation

**screech** tones

**Sea**–viewing Wide Field-of-view Sensor

**seaborgium**

**SeaWiFS**  
*use* Sea-viewing Wide Field-of-view Sensor

Sea-viewing Wide Field-of-view **Sensor**

**Service** Module (ISS)

**Shergotty** Nakhla Chassigny meteorites  
*use* SNC meteorites

**Shuttle** Superlightweight Tank  
*use* external tanks  
 propellant tanks

hardware-in-the-loop **simulation**

in-flight **simulation**

inflight **simulation**  
*use* in-flight simulation

SLWT (propellant tank)  
*use* external tanks  
 propellant tanks

**smart** materials

**SNC** meteorites

**sonochemistry**  
*use* ultrasonic processing

Deep **Space** 1 Mission

DS1 **(space** mission)  
*use* Deep Space 1 Mission

free- **space** optical communication

free- **space** optical interconnects

Ukrainian **space** program

**space** station modules

Next Generation **Space** Telescope project

**space** tourism

**space** weather

AM-1 (EOS) **spacecraft**  
*use* Terra spacecraft

EOS AM-1 **spacecraft**  
*use* Terra spacecraft

MGS **(spacecraft)**  
*use* Mars Global Surveyor

Phobos **spacecraft**

Planet-B **spacecraft**  
*use* Nozomi Mars Orbiter

Terra **spacecraft**

Alpha Magnetic **Spectrometer**

AMS **(spectrometer)**  
*use* Alpha Magnetic Spectrometer

|                         |   |
|-------------------------|---|
|                         | <b>PDS (spectroscopy)</b>                       |
|                         | <i>use</i> photothermal deflection spectroscopy |
| photothermal deflection | <b>spectroscopy</b>                             |
|                         | <b>spiral</b> bevel gears                       |
|                         | <b>Stardust</b> Mission                         |
| Population III          | <b>stars</b>                                    |
| primordial              | <b>stars</b>                                    |
|                         | <i>use</i> Population III stars                 |
| space                   | <b>station</b> modules                          |
|                         | <b>stepped</b> leaders                          |
| associative             | <b>storage</b>                                  |
|                         | <i>use</i> associative memory                   |
| fuselage-wing           | <b>stores</b>                                   |
|                         | <i>use</i> wing-fuselage stores                 |
| electronic              | <b>structure</b>                                |
| clamped                 | <b>structures</b>                               |
| zero                    | <b>sum</b> games                                |
| heavy fermion           | <b>superconductors</b>                          |
|                         | <b>superhumps</b> (astronomy)                   |
| Shuttle                 | <b>Superlightweight</b> Tank                    |
|                         | <i>use</i> external tanks propellant tanks      |
| Mars Global             | <b>Surveyor</b>                                 |
| Mars                    | <b>Surveyor</b> 98 Lander                       |
|                         | <i>use</i> Mars Polar Lander                    |
| Mars                    | <b>Surveyor</b> 98 Orbiter                      |
|                         | <i>use</i> Mars Climate Orbiter                 |
| Mars                    | <b>Surveyor</b> 98 Program                      |
| Mars                    | <b>Surveyor</b> 2001 Mission                    |
| time                    | <b>synchronization</b>                          |
| heavy fermion           | <b>systems</b>                                  |
| microelectromechanical  | <b>systems</b>                                  |

## T

|                          |  |
|--------------------------|--|
| wing-body and            | <b>tail</b> configurations                   |
|                          | <i>use</i> body-wing and tail configurations |
| Shuttle Superlightweight | <b>Tank</b>                                  |
|                          | <i>use</i> external tanks propellant tanks   |
| SLWT (propellant         | <b>tank</b> )                                |
|                          | <i>use</i> external tanks propellant tanks   |
| Next Generation Space    | <b>Telescope</b> project                     |
|                          | <b>Terra</b> spacecraft                      |
| field                    | <b>tests</b>                                 |
| hardware-in-the-loop     | <b>tests</b>                                 |
|                          | <i>use</i> hardware-in-the-loop simulation   |
| in vitro methods and     | <b>tests</b>                                 |
| in vivo methods and      | <b>tests</b>                                 |
| Euler-Bernoulli beam     | <b>theory</b>                                |
|                          | <i>use</i> Euler-Bernoulli beams             |
| Mindlin plate            | <b>theory</b>                                |
|                          | <i>use</i> Mindlin plates                    |
|                          | <b>thermal</b> lenses                        |
|                          | <i>use</i> thermal lensing                   |
|                          | <b>thermal</b> lensing                       |
|                          | <b>thermocapillary</b> migration             |
| head up                  | <b>tilt</b>                                  |
|                          | <b>time</b> domain analysis                  |
| finite difference        | <b>time</b> domain method                    |
|                          | <b>time</b> synchronization                  |
| Rossi X Ray              | <b>Timing</b> Explorer                       |
|                          | <i>use</i> X Ray Timing Explorer             |
|                          | <b>Titan</b> 4B launch vehicle               |
| screech                  | <b>tones</b>                                 |
| Comet Nucleus            | <b>Tour</b>                                  |

|            |   |
|------------|---|
|            | <b>tourism</b>                                    |
| space      | <b>tourism</b>                                    |
|            | <b>TRACE</b> satellite                            |
|            | <i>use</i> Transition Region and Coronal Explorer |
| Gabor      | <b>transformation</b>                             |
|            | <b>Transition</b> Region and Coronal Explorer     |
|            | <b>transplutonic</b> planets                      |
|            | <i>use</i> hypothetical planets                   |
| very large | <b>transport</b> aircraft                         |
|            | <b>transverse</b> momentum                        |
| ultrasonic | <b>treatment</b>                                  |
|            | <i>use</i> ultrasonic processing                  |
| hybrid-    | <b>Trefftz</b> finite element method              |
|            | <i>use</i> finite element method Trefftz method   |
|            | <b>Trefftz</b> method                             |
|            | <b>TRMM</b> satellite                             |
|            | <b>Tropical</b> Rainfall Measuring Mission sat    |
|            | <i>use</i> TRMM satellite                         |
| Josephson  | <b>tunneling</b>                                  |
|            | <i>use</i> Josephson effect                       |

## U

|          |   |
|----------|---|
|          | <b>Ukrainian</b> space program                        |
|          | <b>ultrasonic</b> processing                          |
|          | <b>ultrasonic</b> treatment                           |
|          | <i>use</i> ultrasonic processing                      |
|          | <b>undercooling</b>                                   |
|          | <i>use</i> supercooling                               |
|          | <b>Unity</b> connecting module                        |
| Darkstar | <b>unmanned</b> aerial vehicle                        |
|          | <i>use</i> pilotless aircraft reconnaissance aircraft |
| head     | <b>up</b> tilt  |

## V

|                            |   |
|----------------------------|---|
| Darkstar unmanned aerial   | <b>vehicle</b>  |
|                            | <i>use</i> pilotless aircraft reconnaissance aircraft |
| Delta 3 launch             | <b>vehicle</b>  |
| Delta 4 launch             | <b>vehicle</b>  |
| Titan 4B launch            | <b>vehicle</b>  |
| VentureStar launch         | <b>vehicle</b>  |
| X-43                       | <b>vehicle</b>  |
| Long March launch          | <b>vehicles</b>                                       |
| WIG                        | <b>vehicles</b>                                       |
|                            | <i>use</i> wing-in-ground effect vehicles             |
| wing-in-ground effect      | <b>vehicles</b>                                       |
| Zenit launch               | <b>vehicles</b>                                       |
|                            | <b>VentureStar</b> launch vehicle                     |
|                            | <b>very</b> large transport aircraft                  |
| Sea-viewing Wide Field-of- | <b>view</b> Sensor                                    |
| Sea-                       | <b>viewing</b> Wide Field-of-view Sensor              |
| in                         | <b>vitro</b> methods and tests                        |
| in                         | <b>vivo</b> methods and tests                         |
|                            | <b>VLTA</b> (aircraft)                                |
|                            | <i>use</i> very large transport aircraft              |

## W

|            |                       |
|------------|-----------------------|
|            | <b>water</b> sampling |
|            | <b>wave</b> rotors    |
| corrugated | <b>waveguides</b>     |
| dielectric | <b>waveguides</b>     |

evanescent **waves**  
**weakly** interacting massive particles  
 space **weather**  
 Sea-viewing **Wide** Field-of-view Sensor  
**WIG** vehicles  
*use* wing-in-ground effect vehicles  
**Wild 2** comet  
**WIMPs** (astronomy)  
*use* weakly interacting massive particles  
**wing**-body and tail configurations  
*use* body-wing and tail configurations  
**wing**-body configurations  
*use* body-wing configurations  
 nacelle **wing** configurations  
*use* wing nacelle configurations  
**wing**-in-ground effect vehicles  
 fuselage- **wing** stores  
*use* wing-fuselage stores

## X

planet **X**  
*use* hypothetical planets  
**X-32** aircraft  
**X-35** aircraft  
**X-43** vehicle  
 Chandra **X** Ray Astrophysics Facility  
*use* X Ray Astrophysics Facility  
 Rossi **X** Ray Timing Explorer  
*use* X Ray Timing Explorer

## Z

**Zarya** control module  
**Zenit** launch vehicles  
**zero** sum games

# **NASA THESAURUS SUPPLEMENT**

## **PART 3 CHANGES**

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